UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/391,473	09/08/1999	NOBORU KUBO	4930(840)	8652

7590 02/08/2006

EDWARDS & ANGELL, LLP
P.O. BOX 55874
BOSTON, MA 02205

EXAMINER	
WHIPKEY, JASON T	
ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/391,473	KUBO ET AL.	
	Examiner	Art Unit	
	Jason T. Whipkey	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 9-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4,6 and 9-19* is/are allowed.

6)☒ Claim(s) *1-3 and 5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-3 and 5 have been considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levine (U.S. Patent No. 4,253,120) in view of Houchin (U.S. Patent No. 5,047,861).

Regarding **claim 1**, Levine discloses a pixel defect detector for a solid-state imaging device (imager 100 in Figure 2), comprising a plurality of photoelectric transducers (picture sampling elements 206), the pixel defect detector comprising:

a calculation section (discrimination means 900 in Figure 9) for obtaining output characteristics of a subject photoelectric transducer (inputted pixel III) for amounts of light incident thereupon (defect detection and correction are performed in real time during actual use of the camera; see column 1, lines 54-59) so as to determine the presence/absence of a defect in the subject photoelectric transducer based on the output characteristics thereof (see column 6, lines 40-44), wherein

an output corresponding to a non-defective photoelectric transducer (the output of averaging circuit 906) is calculated based on outputs from a plurality of photoelectric transducers neighboring the subject photoelectric transducer (pixels II and IV, which correspond to the pixels preceding and following pixel III; see column 7, lines 9-12) for one of the amounts of incident light without requiring specific amounts of incident light (defect detection occurs during the actual use of the camera and not in a special mode; see column 1, lines 54-59), and

the calculated output corresponding to a non-defective transducer is used in determining the presence/absence of a defect in the subject photoelectric transducer (see column 8, lines 6-8).

Levine is silent with regard to the transducers being subject to at least three amounts of light.

Houchin discloses an imaging device that:

> obtains output characteristics of a subject photoelectric transducer for at least three amounts of light incident thereupon (see column 8, line 66, through column 9, line 12).

As stated in column 9, lines 3-8, an advantage of using at least three amounts of incident light is that a pixel's non-linear characteristics can be measured. For this reason, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have Levine's image sensor be subjected to at least three amounts of light.

Regarding **claim 2**, Levine discloses:

> the pixel defect detector further comprises a memory (tapped delay line 800 in Figure 8 stores a number of pixels used in the detection of a pixel defect) for storing an output signal from the photoelectric transducer; and
>
> the calculation section determines the output characteristics of the subject photoelectric transducer using the output signal of the subject photoelectric transducer stored in the memory (column 6, lines 28-37).

Levine is silent with regard to specifically using a memory that can store an entire picture.

Official Notice is taken that picture memories are commonly used to hold entire images before image processing. An advantage of using such a memory is that a delay in image processing would not result in the loss of image data. For this reason, it would have been

obvious at the time of invention to have Levine's defect detector store image signals in a picture memory prior to processing.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levine in view of Houchin and further in view of Heller (U.S. Patent No. 6,396,539).

Claim 3 may be treated like claim 1. However, Levine is silent with regard to the output characteristics of the photoelectric transducer being represented by a plurality of output signals in response to different amounts of incident light.

Heller discloses:

> the output characteristics of the subject photoelectric transducer are represented by a plurality of output signals of the subject photoelectric transducer in response to different amounts of light incident thereupon, respectively (see column 8, lines 8-17).

An advantage of using different amounts of light to determine photoelectric transducer output characteristics is that both white and dark defects may be detected. For this reason, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have Levine's defect detector use a plurality of output signals to determine photoelectric transducer output characteristics.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Levine in view of Houchin and further in view of Contini (U.S. Patent No. 6,184,529).

Claim 5 may be treated like claim 1. However, Levine is silent with regard to using a defocused optical system for calibration.

Contini discloses a uniformity correction apparatus for an imaging system. As stated in column 2, lines 42-48, an advantage of using a defocused optical device when calibrating an imaging device is that a uniform photon flux may be cast upon the imaging device without needing a perfectly uniform illumination device. For this reason, it would have been obvious at the time of invention to have Levine include a defocused optical system, such as the one described by Contini.

Allowable Subject Matter

7. Claims 4, 6, and 9-19 are allowed.

Regarding claims 4, 6, 9, and 18, no prior art could be located that teaches or fairly suggests a pixel defect detector for a solid-state imaging device that determines coefficients a and b for the given Expression (1) using neighboring pixels and compares the coefficients with predetermined levels, wherein specific amounts of incident light are not required in the equation and the output of the equation is used to determine the presence/absence of a defect of a subject photoelectric transducer.

Regarding claims 10, 11, and 19, no prior art could be located that teaches or fairly suggests a pixel defect detector that sets a coefficient in the given equation to a median of the outputs of a specific set of photoelectric transducers.

Regarding claims 12-17, no prior art could be located that teaches or fairly suggests an image sensor calibration system that detects defective pixels using the given equations.

Conclusion

8. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Whipkey, whose telephone number is (571) 272-7321. The examiner can normally be reached Monday through Friday from 9:00 A.M. to 5:30 P.M. eastern daylight time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ngoc-Yen Vu, can be reached at (571) 272-7320. The fax phone number for the organization where this application is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JTW
JTW
February 1, 2006

NGOC-YEN VU
PRIMARY EXAMINER